

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application.

Listing of Claims:

1. (currently amended): A method for manufacturing a semiconductor device, comprising the steps of:

forming a wiring comprising silicon on a surface of a semiconductor substrate;
covering part of the wiring with a resist pattern;
implanting arsenic ions into the wiring using the resist pattern as a mask;
removing the resist pattern;
thinning the wiring by removing a surface layer of the wiring to a depth of at least 5 nm;
forming a refractory metal film and a TiN film on an entire surface of the silicon surface;

and

thermally treating in a nitrogen gas atmosphere so as to form a metal silicide film on a surface of the wiring by causing reaction between a surface layer of the thinned wiring and a refractory metal which reacts with silicon to form silicide,

wherein the wiring thinning step comprises the steps of:

oxidizing the wiring for at most 20 seconds, using a rapid thermal processing in an atmosphere including an oxygen gas and a hydrogen gas, beginning on an upper surface thereof down to a predetermined depth; and

removing an oxidized section of the wiring oxidized in the oxidizing step.

2. (original): A method for manufacturing a semiconductor device according to claim 1, wherein the metal silicide forming step comprises the steps of:

depositing a metallic film comprising a refractory metal which reacts with silicon to form silicide, on a surface of the wiring; and

forming a metal silicide layer on an interface between the wiring and the metallic film by causing reaction therebetween.

3. (canceled)

4. (original): A method for manufacturing a semiconductor device according to claim 1, wherein the metal is cobalt.

5. (currently amended): A method for manufacturing a semiconductor device, comprising the steps of:

forming wiring comprising silicon on a surface of a semiconductor substrate;

covering part of the wiring with a resist pattern;

implanting arsenic ions into the wiring using the resist pattern as a mask;

removing the resist pattern;

oxidizing the wiring for at most 20 seconds, using a rapid thermal processing in an atmosphere including an oxygen gas and a hydrogen gas, beginning on an upper surface thereof down to a predetermined depth;

removing an oxidized section of the wiring oxidized in the oxidizing step and thereby thinning the wiring; and

forming a refractory metal film and a TiN film on an entire surface of the silicon surface;

and

thermally treating in a nitrogen gas atmosphere so as to form a metal silicide film on a surface of the wiring by causing reaction between a surface section of the thinned wiring and a refractory metal which reacts with silicon to form silicide.

6. (original): A method for manufacturing a semiconductor device according to claim 5, wherein the metal silicide forming step comprises the steps of:

depositing a metallic film comprising a refractory metal which reacts with silicon to form silicide, on a surface of the wiring; and

forming a metal silicide layer on an interface between the wiring and the metallic film by causing reaction therebetween.

7. (original): A method for manufacturing a semiconductor device according to claim 5, wherein the oxidation depth to oxidize the wiring is at least 5 nm, the oxidation depth being less than a thickness of the wiring.

8. (original): A method for manufacturing a semiconductor device according to claim 5, wherein the refractory metal is cobalt.

9. (previously presented): A method of manufacturing a semiconductor device according to claim 1, wherein in the step of oxidizing the wiring, the oxidation is conducted in an atmosphere including an oxygen gas and a hydrogen gas.

10. (canceled)

11. (new): A method for manufacturing a semiconductor device, comprising the steps of:
forming a wiring comprising silicon on a surface of a semiconductor substrate;
covering part of the wiring with a resist pattern;
implanting ions into the wiring using the resist pattern as a mask to form a carbon containing region in a surface layer of the wiring in the vicinity of an edge of the resist pattern;
removing the resist pattern;
oxidizing the surface layer of the wiring to form an oxide film so that the carbon containing region is merged into the oxide film using a rapid thermal processing apparatus;
removing the oxide film; and
forming a metal silicide film on a surface of the wiring by causing reaction between a surface layer of the wiring and a refractory metal which reacts with silicon to form silicide.